

I CLAIM:

1. A design analysis workstation (DAW) for analyzing an integrated circuit, the integrated circuit having been subjected to a sequence of deconstruction steps in which a digital image-mosaic of the integrated circuit was acquired at each deconstruction step to permit design and layout information to be extracted therefrom, the DAW comprising:
 - a) means for displaying each image-mosaic in a corresponding mosaic-view;
 - b) means for displaying an annotation overlay over an image-mosaic in at least one of the mosaic-views; and
 - c) means for editing annotation objects associated with the annotation overlay.
2. A design analysis workstation as claimed in claim 1, wherein each image-mosaic is displayed in a respective mosaic-view as a background image to the annotation overlay.
3. A design analysis workstation as claimed in claim 1, wherein the annotation overlay has see-through properties to permit the annotation objects to be created and edited using information derived from at least one underlying image-mosaic.

4. A design analysis workstation as claimed in claim 1, wherein each one of the annotation objects has associated attributes.
5. A design analysis workstation as claimed in claim 1 further comprising means for concurrently displaying a plurality of annotation overlays.
6. A design analysis workstation as claimed in claim 5 further comprising means for synchronizing the display of the plurality of image-mosaics displayed in a respective plurality of mosaic-views.
7. A design analysis workstation as claimed in claim 6, wherein the means for synchronizing the display of the plurality of image-mosaics includes means for panning the plurality of image-mosaics by a specified distance that is the same for each image-mosaic.
8. A design analysis workstation as claimed in claim 6, wherein the means for synchronizing the display of the plurality of image-mosaics includes means for zooming the plurality of image-mosaics by a specified zoom factor that is the same for each of the image-mosaics.
9. A design analysis workstation as claimed in claim 5, wherein editing annotation objects based on information derived from a plurality of image-mosaics displayed in respective mosaic-views is facilitated by a plurality of synchronized view-cursors

respectively displayed in the plurality of mosaic-views.

10. A design analysis workstation as claimed in claim 9, wherein the synchronized view-cursors move in lock-step with a master-cursor displayed in a one of the mosaic-views, the master-cursor being controlled by a pointing device operatively associated with the design analysis workstation.
11. A design analysis workstation as claimed in claim 5 further comprising image-mosaic comparison means for comparing selected portions of image-mosaics displayed in a plurality of mosaic-views.
12. A design analysis workstation as claimed in claim 11, wherein the image-mosaic comparison means includes an image-mosaic comparison view displaying respective portions of the image-mosaics.
13. A design analysis workstation as claimed in claim 1, wherein each mosaic-view includes an annotation overlay selector.
14. A design analysis workstation as claimed in claim 4, wherein the attributes are editable.
15. A design analysis workstation as claimed in claim 4, wherein the annotation object has a predetermined group of attributes.

16. A design analysis workstation as claimed in claim 15, wherein the annotation object further comprises at least one layer attribute.
17. A design analysis workstation as claimed in claim 16, wherein a wire annotation object comprises an associated layer attribute and signal carrying characteristics.
18. A design analysis workstation as claimed in claim 17, wherein the layer attribute associated with the wire annotation object may specify a layer different from the image-mosaic associated with the annotation overlay with which the wire annotation object is associated.
19. A design analysis workstation as claimed in claim 16, wherein a contact annotation object comprises two associated layer attributes, the contact annotation object specifying inter-layer connectivity using the two associated layer attributes.
20. A design analysis workstation as claimed in claim 1, wherein an annotation object has annotation properties.
21. A design analysis workstation as claimed in claim 20, wherein the annotation properties are editable.
22. A design analysis workstation as claimed in claim 20, wherein the annotation properties are extensible.

23. A design analysis workstation as claimed in claim 20, wherein the annotation properties include key-value pairs.
24. A design analysis workstation as claimed in claim 1 further comprising means for performing operations on selected annotation objects.
25. A design analysis workstation as claimed in claim 24 further comprising means for performing measurements of selected features of an image-mosaic.
26. A design analysis workstation as claimed in claim 25, wherein the means for performing measurements includes means for performing linear measurements.
27. A design analysis workstation as claimed in claim 25, wherein the means for performing measurements includes means for performing area measurements.
28. A design analysis workstation as claimed in claim 24, wherein the selected annotation objects are aggregated into an annotation object group.
29. A design analysis workstation as claimed in claim 28 further comprising means for associating properties with the annotation object group.
30. A design analysis workstation as claimed in claim 29, wherein annotation properties associated with an annotation object group override annotation

properties associated with individual annotation objects aggregated into the annotation object group.

31. A design analysis workstation as claimed in claim 28, wherein the annotation object group comprises a collection of at least two annotation object groups.
32. A design analysis workstation as claimed in claim 31, wherein the annotation object group further includes a cell specification.
33. A design analysis workstation as claimed in claim 32, wherein the cell specification specifies at least one port.
34. A design analysis workstation as claimed in claim 33, wherein the port has signal directionality.
35. A design analysis workstation as claimed in claim 34, wherein the signal directionality comprises one of input signaling, output signaling and bi-directional signaling.
36. A system for extracting design and layout information from a plurality of image-mosaics representative of a deconstructed integrated circuit, the system comprising means for enabling parallel design analysis of the image-mosaics by a plurality of engineer analysts concurrently reverse engineering an IC.

37. A system as claimed in claim 36, wherein the plurality of image-mosaics are annotated concurrently using a plurality of design analysis workstations.
38. A system as claimed in claim 37, wherein each one of the annotation objects created using a design analysis workstation participating in parallel design analysis includes an ownership attribute specifying an engineer analyst associated with the design analysis workstation at a time when the annotation object was created.
39. A system as claimed in claim 38, wherein annotation objects include an identification string, and the system further comprises means for generating unique identification strings.
40. A system as claimed in claim 38, wherein annotation objects having different ownership attributes can be merged for display on one design analysis workstation.
41. A method of analyzing the layout of a deconstructed circuit using a design analysis workstation, comprising a step of performing at least one edit operation on at least one annotation object associated with an annotation overlay superimposed over an image-mosaic captured after one step in deconstructing the integrated circuit, the image-mosaics being displayed in at least one of a plurality of concurrently displayed mosaic-views.

42. A method as claimed in claim 41, wherein performing the edit operation on the annotation object comprises a step of creating the annotation object before the edit operation is performed.
43. A method as claimed in claim 42, wherein creating the at least one annotation object further comprises a step of drawing at least one schematic.
44. A method as claimed in claim 43, wherein creating the annotation object comprises a step in which the system associates the created annotation object with an annotation overlay in which the operation to create the annotation object was started.
45. A method as claimed in claim 43, wherein creating the annotation object further comprises a step of labeling the schematic.
46. A method as claimed in claim 42, wherein creating the annotation object further comprises a step of creating a wire annotation object associated with a layer, the wire annotation object representing a signal carrier.
47. A method as claimed in claim 42, wherein creating the annotation object further comprises a step of creating a connection annotation object associated with first and second layers of the integrated circuit, and representing signal connectivity between

other annotation objects using the connection annotation object.

48. A method as claimed in claim 42, wherein performing the edit operation on the annotation object further comprises a step of modifying the annotation object.
49. A method as claimed in claim 48, wherein modifying the annotation object further comprises a step of associating the annotation object with an annotation overlay in which an edit operation that moved the annotation object ended, when an annotation object is moved.
50. A method as claimed in claim 48, wherein modifying the annotation object further comprises a step of associating the annotation object with an annotation overlay in which an edit operation that copied the annotation object ended, when an annotation object is copied.
51. A method as claimed in claim 48, wherein modifying the annotation object further comprises a step of hiding the annotation object from being displayed, in order to prevent accidental editing thereof.
52. A method as claimed in claim 48, wherein modifying the annotation object further comprises a step of locking the annotation object, to prevent modification thereof.

53. A method as claimed in claim 41, wherein the method further comprises a step of saving at least one annotation object independently of the annotation overlays associated with the respective image-mosaics.
54. A method as claimed in claim 53, wherein the method further comprises a step of loading the at least one saved annotation object independently of the annotation overlays associated with the respective image-mosaics.
55. A method as claimed in claim 41, wherein the method further comprises a step of selecting at least one annotation object for inclusion in a selection group.
56. A method as claimed in claim 55, wherein selecting the at least one annotation object further comprises steps of:
- a) pointing at the at least one annotation object using a pointing device associated with the design analysis workstation; and
 - b) manipulating one of the pointing device and at least one key of the design analysis workstation to select the at least one annotation object for inclusion in the selection group.
57. A method as claimed in claim 55, wherein selecting the at least one annotation object further comprises a step of selecting the at least one annotation

object for inclusion in the selection group subsequent to an annotation object search.

58. A method as claimed in claim 57, wherein subsequent to selecting the at least one annotation object for inclusion in the selection group, the method further comprises a step of panning the mosaic-views to display at least one selected annotation object.
59. A method as claimed in claim 57, wherein subsequent to selecting the at least one annotation object for inclusion in the selection group, the method further comprises a step of zooming the mosaic-views to display at least one selected annotation object.
60. A method as claimed in claim 55, wherein the method further comprises a step of performing at least one edit operation on the selection group.
61. A method as claimed in claim 60, wherein performing the edit operation on the selection group further comprises a step of grouping selected annotation objects in the selection group to form an annotation object group.
62. A method as claimed in claim 61, wherein the method further comprises a step of performing at least one edit operation on the annotation object group.
63. A method as claimed in claim 41, wherein performing the at least one edit operation on the at least one

annotation object further comprises a step of undoing at least one edit operation performed on the at least one annotation object.

64. A method as claimed in claim 63, wherein performing the edit operation on the at least one annotation object further comprises a step of redoing at least one edit operation performed on the at least one annotation object.
65. A method as claimed in claim 41, wherein the method further comprises steps of:
 - a) creating an annotation property; and
 - b) associating the annotation property with the at least one annotation object.
66. A method as claimed in claim 65, wherein the method further comprises a step of editing the annotation property associated with the annotation object.
67. A method as claimed in claim 66, wherein the method further comprises a step of displaying the annotation property in an annotation object information pop-up window.
68. A method as claimed in claim 65, wherein the method further comprises a step of configuring the annotation object information pop-up window to persist, pending an action to close the window.

69. A method as claimed in claim 41, wherein the method further comprises a step of defining at least one cell that performs design and layout extraction.
70. A method as claimed in claim 69, wherein the cell includes at least one annotation object.
71. A method as claimed in claim 69, wherein the cell includes at least one annotation object group.
72. A method of analyzing a design of a deconstructed integrated circuit using a design analysis workstation, comprising a step of propagating signal information from an annotation object having a signal property to at least one connected annotation object.
73. A method as claimed in claim 72 further comprising a step of propagating signal information between a cell and a wire annotation object.
74. A method as claimed in claim 73 further comprising a step of generating a net-list from interconnected cells.
75. A method as claimed in claim 72, wherein propagating signal information further comprises steps of:
 - a) selecting all contact annotation objects connected to a wire annotation object, the wire annotation object and the contact annotation objects having at least one specified layer in common; and

- b) propagating signal information from the wire annotation object to all annotation objects connected to the contact annotation objects.
76. A method as claimed in claim 75 further comprising a step of detecting a logical short if two different signals are propagated to a given annotation object.
77. A method as claimed in claim 76, wherein on detecting the logical short the method further comprises a step of displaying information about the logical short on the design analysis workstation.